McPherson, Nebraska, and, accompanied by an escort of two companies of U. S. Cavalry, proceeded to the Niobrara, and worked in that country for several weeks. Owing to hostile Indians, the explorations of the party here were attended with much difficulty and danger, but were on the whole quite successful. Many new animals were discovered, and ample material secured for a full investigation of those previously known from that region.

A second expedition was made in August from Fort Bridger, Wyoming, and large collections of Eocene fossil vertebrates were obtained, especially of the *Dinocerata*, *Quadrumana* and *Cheiroptera*, which had first been brought to light by the researches of the party in previous years. A third trip was made in September to the Tertiary beds of Idaho and Oregon, where some interesting discoveries were made. The party went from Oregon to San Francisco by sea, narrowly escaping shipwreck, and then returned east by rail. On the way, short visits were made to localities in Colorado and Kansas, to complete investigations begun last year. The expedition as a whole was very successful, not merely on account of the large number of new animals discovered, but also on account of the extensive collections made to complete the study of those previously found. All of the collections secured are now in the museum of Yale College.

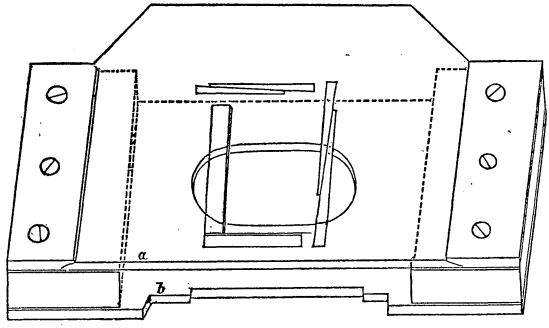
MICROSCOPY.

A New Section Cutter.—Prof. T. D. Biscoe has contrived a new section cutter which is principally adapted for preparing sections of soft vegetable tissues and organs, such as leaves, buds, etc. It consists essentially of a large glass stage-plate upon which the object is fastened, and a movable frame to slide upon this, carrying a razor blade at an adjustable distance from the plate. This apparatus cuts sections of objects while they are under observation on the stage of the microscope, under powers as high as the $\frac{2}{3}$ inch ($\times$ 80); and with it Prof. Biscoe has been able to cut series of fifteen consecutive sections, each one of which was perfect and the average thickness of which was $\frac{1}{8000}$ inch. The following is his description of the contrivance.

"Fig. 41 is a plate that fits on to the stage of the microscope with a tight friction, yet so that it has movements of an inch or

more in any direction, so that the object can be brought into the field of view; *a* is a glass plate held in place by the two pieces of wood with screws on the right and left; *b* is the wooden base of the affair with an oval opening for the illuminating apparatus to come up; this wooden base being covered on the inner or upper side with velvet to make smooth the friction on the under side of the stage. For use with a mechanical stage this arrangement is modified and much simplified, the large glass plate being merely attached to the stage, whose screw movements enable the object to be brought into the field of view. On the middle of the upper side of the glass plate are cemented four strips of glass as shown, just far enough apart to take in a common glass slide which is held in place by a couple of wedges of common sheet brass; and on the middle of a slide is fastened the object to be cut, either with gum

Fig. 41.



arabic or sometimes with collodion. For holding hard objects like wood the arrangements are not yet quite perfected, but no special difficulty is expected.

Fig. 42 gives a perspective view of the triangular wooden frame that holds a razor blade, *r*, whose edge and back come down lower than the rest of the frame. By means of the three screws with graduated heads the whole frame, razor and all, is raised or lowered from the glass plate (*a*, Fig. 41) on which the triangle rests and slides with these three screws as its feet. These three supporting screws are cut with a thread that counts forty to the inch; the screw head is divided into one hundred equal parts, and can be moved without much difficulty through half of one division, giving a vertical motion of $\frac{1}{8000}$ inch to the cutting edge.

Fig. 43 is a large view of one of the screws, with its indicator. The indicator may be a simple pin set in the wooden frame, but is more convenient if made movable around the axis of the screws, so that when the razor is returned after sharpening they may be all turned around to the 0 of their respective screws and therefore all read alike while the successive cuts are being made. On the side of the indicators are scales which show how many complete revolutions of the screws have been made. These indicators should move quite stiffly, so as not to be accidentally misplaced when turning the screw heads.

With the hands upon the triangle and the eye at the microscope tube, the razor can be moved so that its edge shall either make a drawing cut or push straight through the object like a chisel, ac-

Fig. 42.

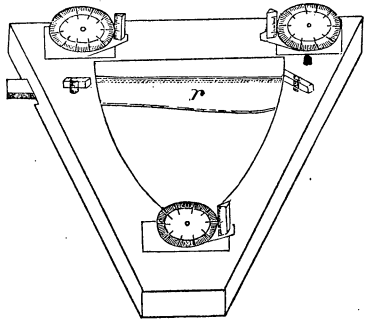
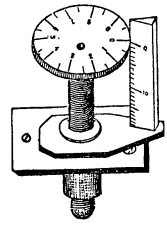


Fig. 43.



cording as either method or any gradation between them suits best the nature of the substance cut. Thus perfectly even slices can be cut, and it is quite easy to take them in consecutive order even when called off in the midst of the work and compelled to wait half an hour before resuming it. It is a luxury to take off slice after slice and know that there is no danger of losing just the slices you want especially to see. The object is kept wet with glycerine, and just as the razor begins to cut, a drop of glycerine is placed on its edge in which the slice floats without sticking; though care must be taken in the case of very thin and small sections not to lose them in a large drop of glycerine in which they would be found with great difficulty. By this method slices $\frac{1}{8000}$ of an inch in thickness, or rather in thinness, can be all worked out nicely, though before it was adopted such thin slices were all

torn, so as to be unrecognizable. Whether a blade can be made to cut any thinner than that has not been tried; but it may be remarked that the first razor blade used gave out at $\frac{1}{24000}$ inch thick, and would not take an edge capable of cutting finer than that."

NOTES.

After twenty-seven years of unremitting toil for the advancement, the exaltation and free spread of science in this country, the land of his adoption, Louis Agassiz died, in the ripeness of his years, Dec. 14, aged sixty-six. It is not the time now to estimate Professor Agassiz's scientific attainments and compare him with his contemporaries, but to mourn the loss of one whose profound learning and genius for original research; whose organizing abilities, courageous adherence to the dictates of his conscience when matters of scientific faith were at stake; whose persuasive eloquence, rare personal magnetism, conspicuous enthusiasm, and untiring industry which, though it shortened his life, intensified its value, made him one of the remarkable men of the century.

A student and friend of Humboldt and Cuvier, and enjoying the instructions of Oken, Tiedemann and others, he certainly had wonderful advantages, and by his native genius and sturdy industry made the most of them, his reputation being more than European before he was thirty years of age. At the age of thirty-nine he came to this country, travelled extensively, and extended his glacial theory to include both hemispheres. Here he began to build up the Museum of Comparative Zoology, his singleness of purpose, rare personal qualities and disinterested zeal, winning him friends and means for carrying on that vast establishment. Meanwhile he travelled and lectured over the country; everywhere by his native unaffected eloquence winning men to a just appreciation of the objects and needs of science, and elevating and dignifying the pursuit of knowledge for its own sake. He was an admirable teacher, and introduced new methods of studying zoology. He gathered about him a number of young men, some of whom were associated with him in the preparation of the material for his great work, "Contributions to the Natural History of the United States;" and so powerful was his influence over his students that he may be said to have founded a school in natural history, based on the spirit of Cuvier, who moulded Agassiz himself in his student days.